EFFECTIVENESS OF CONSTRAINT INDUCED MOVEMENT THERAPY IN IMPROVING UPPER LIMB FUNCTION ON PATIENTS WITH HEMIPLEGIA

By

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PADMAVATH COLLEGE OF PHYSIOTHERAPY

PERIYANAHALLI

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Submitted in Partial fulfillment of the requirements for the

Degree of **Master of Physiotherapy**

From

The Tamilnadu Dr. M.G.R. Medical University,

Chennai

PADMAVATH COLLEGE OF PHYSIOTHERAPY

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CERTIFICATE

This is to certify that the project entitled **"EFFECTIVENESS OF CONSTRAINT INDUCED MOVEMENT THERAPY IN IMPROVING UPPER LIMB FUNCTION ON PATIENTS WITH HEMIPLEGIA"**

Submitted by the candidate

(Reg. No . 27101807)

is a bonafide work done in partial fulfillment of the requirements for the Degree of **Master of Physiotherapy** from

The Tamilnadu Dr. M.G.R. Medical University,

Chennai

Guide **Principal**

Viva-voce Examination held on _____

Internal Examiner **External Examiner**

DECLARATION

I hereby declare and present my dissertation entitled entitled **"EFFECTIVENESS OF CONSTRAINT INDUCED MOVEMENT THERAPY IN IMPROVING UPPER LIMB FUNCTION ON PATIENTS WITH HEMIPLEGIA"** the outcome of the original research work undertaken and carried out be me , under the guidance of **Mr. G. ELAVARASAN, M.P.T. , MIAP.,** Assistant Professor , Padmavathi College of Physiotherapy, Periyanahalli, Dharmapuri , Tamilnadu.

I also declare that the material of this dissertation had not formed in any basis for the award of any other Degree previously from the Tamilnadu Dr. M.G.R. Medical University, Chennai.

(ANSIL ALI. K)

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(ANSIL ALI. K)

DEDICATED TO MY BELOVED

PARENTS , STAFFS

AND

LOVABLE FRIENDS

TABLE OF CONTENTS

INTRODUCTION

Stroke is an acute onset of neurological dysfunction due to abnormality in cerebral circulation with resultant signs and symptoms that correspond to the involvement of focal areas of the brain. It is one of the most common cause of disability among adults in the world and third leading cause for death. The severity of neurological deficit in stroke affected patients depends on the locomotion and extent of lesion and the amount of collateral blood flow.

The men have a higher incidence of stroke than women and it has greater incidence in population aged 60-75 yrs.

Hemiplegic shoulder pain is a common complication after stroke with incidence rates ranging form 38-84% of cases. Pain is described as a sharp and stabbing and is more common on movement than rest.

In spastic stage, abnormal Muscle tone may contribute to poor scapular position (Depression, retraction, downward rotation) and contributes to subluxation and restricted movement. Secondary tightness of ligaments, tendons and joint capsule can develop quietly and leading to pain during shoulder movement.

For Functional assessment of upper limb dysfunction following measure were used: Functional independent scale, Barthel index, Kartz

index, Fugl-meyer assessment scale, Modified barthel index, Performance based assessment. In this study Fugl-meyer assessment scale were used to assess the upper limb dysfunction.

Constraint induced movement therapy is a rehabilitation approach that is designed to reduce in capitating motor deficits of the upper limbs in patient after neurological injury and increase their functional independence.

STATEMENT OF THE STUDY

Effectiveness of constraint induced movement therapy in improving upper limb function on patients with hemiplegia .

AIM AND NEED OF THE STUDY

AIM OF THE STUDY

The aim of the study is to know whether the constraint induced movement therapy is effective in improving upper limb function on patients with hemiplegia. An effective measure for the rehabilitation of stroke patients will certainly help both the patients and rehabilitation team. Thus, if this study is proved to be effective this can be used as an adjunct in the rehabilitation of hemiplegia

REVIEW OF LITERATURE

1. **Fugl-meyer A.R. et. al., (1975)** Carried out a study in history of stroke patients to find out the reliability of Fugl-meyer Assessment scale for upper extremity and lower extremity motor balance. The selected patients were treated with weight bearing through the palm and hand. The study result showed that fugl meyer assessment scale as reliable measure of balance in upper extremity with stroke.
2. **Luke.C, (1985)** Concluded that, CIMT was significantly improving upper limb impairment activity (or) participation.
3. **Enjo Walker, (1989)** Concluded that, use of Fugl - meyer Assessment scale and Barthel-Index scale was shown to be a good measuring instrument for the classification of general clinical performance of the patient.
4. **Lincoln.NB, (1995)** Found that, CIMT significantly reduce the shoulder pain and improving hand function on patients with hemiplegia
5. **Leaderi. M, (1995)** Suggested that, CIMT was more effective in reduction of shoulder pain and improving upper limb function on patients with hemiplegia.
6. **Benvenuti.P, (1998)** Concluded that, Fugl-Meyer Assessment scale was a valid and reliable tool to measure the upper limb function.

7. **Roberta de Oliveiral (1999)** Concluded that, CIMT was significantly improved hand function in patients with hemiplegia

8. **Walsh. K., (2000)** Stated that, CIMT significantly improving hand function in patients with hemiplegia

9. **Gialanella. B, (2003)** Found that , CIMT was more effective in reduction of shoulder pain and improving upper limb function in hemiplegia

10. **Corriveau. H, (2007)** Concluded that, there was a significant improvement in upper limb function following the application of CIMT.

11. **Nilsson L., et.al., (1998)** showed that, constraint induced movement is significantly effective in improving upper limb function

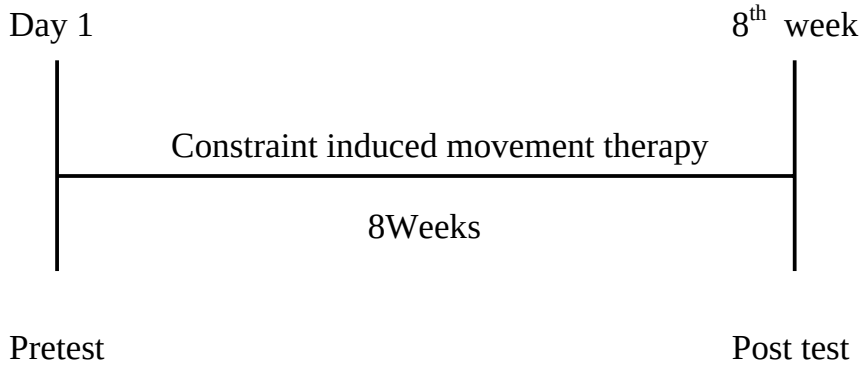
12. **Moseley A.M., et.al., (2000)** Conclude that, constraint induced movement was significantly effective in improving upper limb function in hemiplegia

13. **Corriveau. H, (2007)** concluded that, there was a significant improvement in upper limb function following the application of constraint induced movement.

RESEARCH DESIGN AND METHODOLOGY

RESEARCH DESIGN

The study was quasi experimental in nature.



Pretest measurements of upper limb function was measured using Fugl - meyer scale.

CRITERIA FOR SELECTION

Inclusion Criteria

- Age 40-60 years
- Both sex
- Chronic stroke patients
- MCA involvement only
- Side - both side

Exclusion Criteria

- Shoulder dislocation
- Recent fractures
- Traumatic brain injury
- Cognitive impairment
- Cervical meylopathy
- Brachial plexus injury

POPULATION

All the patients who fulfilled the selection criteria were taken as the population of the study.

SAMPLE SIZE AND METHOD OF SELECTION

10 samples were selected from the population using simple random sampling method.

VARIABLES

Independent variable

- Constraint induced movement therapy

Dependent Variable

- Upper limb function

VALIDITY AND RELIABILITY OF THE TOOL USED

Fugl-meyer scale is a valid and reliable tool to measure upper limb function.

SETTING

The study was conducted at the department of Post graduate studies of Vinayaka Missions College of physiotherapy, Salem and the patients were selected from VMKV medical college hospital, Salem.

METHODOLOGY

A pilot study was conducted prior to the main study with subjects to observe the feasibility of study.

After this, samples of subjects were selected using simple random sampling method from the population.

All the participants were explained about the purpose and procedure of study and written consent was obtained from them before being included in the study.

Pre test measurement of upper limb function was done using Fugl-meyer scale.

PROCEDURE

CONSTRAINT INDUCED MOVEMENT THERAPY (CIMT)

Principles of CIMT

- Constraining the unaffected limb
- Forced use of the affected limb
- Massive practice

This approach has been used most frequently with persons recovering from stroke and the main aim is to retain the brain by constraining the unaffected arm and forcing the use of the weakened arm.

The patient were engaged in daily repetitive task and behavioral shaping sessions, which included training in tasks such as,

- Opening a lock
- Turning a door knob
- Pouring a drink
- Eating lunch
- Throwing a ball
- Playing dominoes

The post test measurements of upper limb function where collected at the end of 8^{th} weeks in a similar manner as that of pretest measurement.

OBSERVATION AND ANALYSIS

The collected data were analyzed using paired “t” test

Table 1.1

Constraint Induced Movement Therapy

Variable	“t” cal value	“t” table value
Upper limb function	18.48*	2.262

- “t” calculated value > “t” table value

  Significant at 5% level.

RESULTS AND DISCUSSIONS

RESULTS

The data was subjected to statistical analysis and the following results were obtained.

Constraint induced movement therapy is significantly effective in improving upper limb function on patients with Hemiplegia .

DISCUSSION

The aim of the study was to know the effect of Constraint induced movement therapy in improving upper limb function on patient with Hemiplegia . The results obtained from the study showed a significant improvement in upper limb function after the application of Constraint induced movement therapy as a treatment technique.

The results obtained from the study showed that Constraint induced movement therapy is significantly more effective in improving upper limb function on patients with Hemiplegia .

The improving upper limb function following constraint induced movement therapy may be due Induces long term structural changes in the organization and number of connection among neurons. Parallel and hierarchical processing with in CNS markedly increased which results in

peak amplitude and size of cortical output to the muscles were significantly larger and shorter reaction times. Practice (CIMT) makes the maps of cortiical output to the muscles continued to enlarge until the subjects explicit knowledge of the sequence. Repeated practice of motor skill results in improved synaptic efficiency between the sensory and motor cortext, increases the efficiency of the thalamocortical pathways that are co activated during learning process.

Recovery of arm function was associated with ventral extension of upper limb areas of the cortex (functionally related area). Strengthen of the shift in the hierarchical organization of the cortex, with supplementary motor cortex,premotor cortex descending pathways taking over for the primary corticomotor pathways.

Increased alteration of motor cortex by hard prospected training programme. Co – Activation of many muscles simultaneously present at initial level, of with continuous, hard practice those less efficient contractions are eliminated and only the necessary muscles contact. Extension of upper limb presentation in cortex and pre motor supplementary motor cortex descending pathways taking over the primary corticomotor pathway

The study results conclude with, **Nilsson L., et.al., (1998)** showed that, constraint induced movement was significantly effective in improving the upper limb function on patients with Hemiplegia .

Ann Charistin Eliasson. et. al., (2004) concluded that the constraint include movement therapy shows greater improvement in upper limb function on patients with Hemiplegia.

RECOMMENDATIONS FOR FURTHER STUDY

- Similar study can be conducted by using large samples.
- Similar study can be conducted by using Barthel index to assess the activities of daily living.
- Similar study can be conducted by using the fugl-meyer scale to assess the lower limb functions.
- The duration of the study, for the inclusion of greater number of subjects, is inadequate.
- Further study can be conducted by using motor relearning program.

CONCLUSION

From this study it was concluded that constraint include movement therapy can be used as an effective adjunct in improving upper limb function on patients with Hemiplegia .

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APPENDIX – I

Fugl – Meyer Assessment scale

	Score		
1. Shoulder / elbow / forearm			
1.1. Reflex activity	0	1	2
Flexors (biceps and finger flexors)	0	1	2
Extensors (triceps)			
1.2. Flexors synergy – volitional movement within synergy			
Shoulder retraction	0	1	2
Shoulder elevation	0	1	2
Shoulder abduction	0	1	2
Shoulder external rotation	0	1	2
Elbow flexion	0	1	2
Forearm supination	0	1	2
1.3. Extensor synergy – volitional movement within synergy			
Shoulder adduction / internal rotation	0	1	2
Elbow extension	0	1	2
Forearm pronation	0	1	2
1.4. Volitional movement mixing the dynamic flexor and extensor strategies			
Hand on lumbar spine	0	1	2
Shoulder flexion	0	1	2
Forearm pronation / supination	0	1	2

1.5. Volitional movements are performance with little or no synergy dependence	0	1	2
Shoulder abduction	0	1	2
Shoulder flexion	0	1	2
Forearm pronation / supination			
2. Wrist			
2.1. Wrist stability – elbow 90^0	0	1	2
2.2. Wrist flexion / extension – elbow 90^0	0	1	2
2.3. Wrist stability - elbow 0^0	0	1	2
2.4. Wrist flexion / extension – elbow 0^0	0	1	2
2.5. Circumduction	0	1	2
3. Hand			
Mass flexion	0	1	2
mass extension	0	1	2
Grasp A – distal finger grasp	0	1	2
Grasp B – thumb adduction grasp	0	1	2
Grasp C – thumb to index finger grasp	0	1	2
Grasp D – Cylinder grasp	0	1	2
Grasp E – spherical grasp	0	1	2
4. Co-ordination / speed			
Tremor	0	1	2
Dysmetria	0	1	2
Speed	0	1	2
Upper limb Score			

0 – Unable to perform

1 – Able to perform in part

2 – Able to perform

APPENDIX - II

MASTER CHART

(Constraint include movement therapy)

S.No	Fugl – Meyer Scale	
	Pre test	Post test
1	11	29
2	9	27
3	8	32
4	14	45
5	9	42
6	11	49
7	13	43
8	9	47
9	8	36
10	14	37